

Serial No. 10/722,760

Remarks

Claims 1-33 are pending in the application. New claims 34 and 35 have been added herein. Claim 1 has been amended to further clarify the invention and claim 4 has been amended to depend from new claim 34. Favorable reconsideration of the application, as amended, is respectfully requested.

I. REJECTION OF CLAIMS 1, 2, 4-6, 12-18 AND 31 UNDER 35 USC §102

Claims 1, 2, 4-6, 12-18 and 31 stand rejected under 35 USC 102(b) as being anticipated by U.S. Patent No. 5,619,996 to Beresten. Withdrawal of the rejection is respectfully requested for at least the following reasons.

A. Claims 1, 2, 4-6 and 12-18

Claim 1 has been amended to further clarify the invention and now recites a radio frequency coil that includes a first end ring and at least one of a second end ring or an end cap, and a plurality of elongated segments coupled to and positioned circumferentially around the generally annular opening of the first end ring and the at least one of the second end ring or the end cap to form a coil volume. The generally annular opening has a general radius R about which the plurality of elongated segments are positioned, and includes an anterior extension extending radially beyond the general radius R to facilitate access into the coil volume.

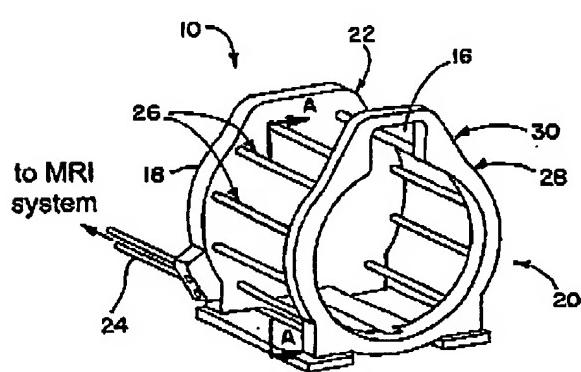


FIG. 3

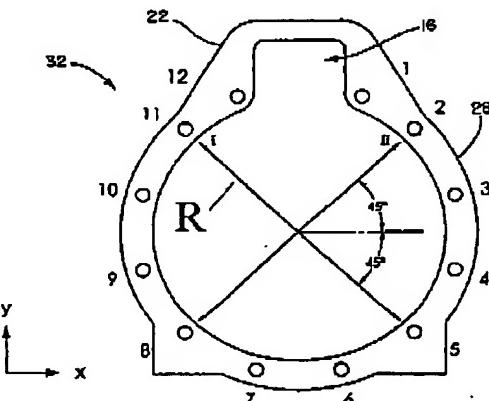


FIG. 4

Serial No. 10/722,760

With reference to Figs. 3 and 4 of the present application (reproduced above), an exemplary anterior extension 22 is illustrated. As can be seen in Figs. 3 and 4, the plurality of elongated segments 26 are positioned about a radius R of the annular opening (The "R" has been added to Fig. 4 to facilitate understanding of the claimed subject matter). The annular extension 22 extends beyond the radius R of the annular opening, and facilitates access into the coil volume. This is advantageous, for example, in that life sustaining lines can be easily coupled to and decoupled from a patient within the coil.

The Examiner contends that *Beresten* discloses an anterior extension and refers to Fig. 3, structures 50 and 51 of *Beresten*. The Applicant notes that the structures 50 and 51 are part of a plastic support structure 29 and, thus, are not part of the coil 35, as recited in claim 1 of the present application.¹ Moreover, the alleged anterior extension blocks entry into the coil volume.² *Beresten* has not been shown to disclose an RF coil having an annular opening with a general radius R about which the plurality of elongated segments are positioned, and an anterior extension extending radially beyond the general radius R to facilitate access into the coil volume, as recited in claim 1 of the present application.

Accordingly, withdrawal of the rejection of claim 1 is respectfully requested.

Claims 2, 4-6 and 12-18 directly or indirectly depend from claim 1 and therefore can be distinguished from *Beresten* for at least the same reasons.

Claim 4 depends from claim 1 and further recites that the first elongated segment and the second elongated segment are spaced apart azimuthally at an angle greater than an azimuthal spacing of the remainder of the plurality of elongated segments. As can be seen in Figs. 3 and 4 above, ten of the twelve legs 26 are spaced apart by about the same angular distance, e.g., about 30 degrees. The two legs about

¹ See column 5, lines 25-36 of *Beresten*.

² See Fig. 3 of *Beresten*, which shows the support structure 29 placed over the coil 35, thereby inhibiting access into the coil volume

Serial No. 10/722,760

the anterior extension 22, however, are spaced apart a greater distance, e.g., about 45 degrees, to facilitate access into the coil volume.³

Beresten discloses that the linear elements 40 are equally spaced in angle, with the two top most linear elements being spaced fifteen degrees to either side of the top center of the coil. Thus, all linear segments 40 are spaced apart equally (i.e. 30 degrees). *Beresten* has not been shown to teach or suggest a first elongated segment and a second elongated segment of the plurality of elongated segments spaced apart azimuthally at an angle greater than an azimuthal spacing of the remainder of the plurality of elongated segments, as recited in claim 4.

Accordingly, withdrawal of the rejection of claims 2, 4-6 and 12-18 is respectfully requested.

B. Claim 31

Claim 31 recites a head coil that includes an end cap, an end ring and a plurality of legs connecting the end cap to the end ring. The plurality of legs are spaced apart azimuthally by 45 degrees.

The Examiner contends that *Beresten* discloses a head coil that includes an end cap, an end ring and a plurality of legs spaced apart azimuthally by 45 degrees, and cites to column 5, lines 37-49, column 6, lines 17-50 and Figs 1-3 of *Beresten* for support. The Applicant respectfully disagrees with the Examiner for at least the following reasons.

Beresten clearly discloses that the bird cage coil includes 12 linear elements that are equally spaced in angle, with the top most two linear elements being spaced fifteen degrees to either side of the top center of the coil.⁴ Thus, all linear segments 40 are spaced apart by 30 degrees. Nowhere in the cited text or figures are a plurality of legs shown wherein the plurality of legs are spaced apart azimuthally by 45 degrees, as recited in claim 31.

³ See Fig 4 and page 11, lines 3-10 of the present application

⁴ See column 5, lines 37-49 and Figs. 2 and 3 of *Beresten*

Serial No. 10/722,760

Claim 31 additionally recites that the head coil includes a plurality of drive points, wherein the drive points are bridged using a push-pull configuration. The Examiner contends that *Beresten* discloses a plurality of bridging drive points in push-pull configuration, and cites to Fig. 6, numerals 46, 47 and column 6, lines 61-67 of *Beresten*.

A push-pull configuration, as is known by those skilled in the art, includes two electrical paths with a common output, each of the electrical paths including an electron discharge device, wherein the respective voltages of each electrical path are out of phase with respect to the other electrical path. Referring to the cited text and figures, *Beresten* discloses a pair of shielded cables 46 and 47 for applying signals to and receiving signals from the birdcage coil. The center leads of the cables are connected to the coil via capacitors 48 and 49. Thus, *Beresten* merely discloses a shielded cable capacitively coupled to the coil. A capacitively coupled shielded cable, however, is not a push-pull configuration. Clearly, *Beresten* does not teach or suggest a plurality of drive points, wherein the drive points are bridged using a push-pull configuration, as recited in claim 31.

Accordingly, withdrawal of the rejection of claim 31 is respectfully requested.

II. REJECTION OF CLAIMS 1, 3, 7-11, 19-29 AND 30-33 UNDER 35 USC §103

Claims 1, 3, 7-11, 19-26 and 30 stand rejected under 35 USC 103(a) as being unpatentable over U.S. Patent No. 6,611,702 to *Rohling et al.* (hereinafter *Rohling*) in view of *Beresten*. Claims 27-29 and 32-33 stand rejected under 35 USC 103(a) as being unpatentable over *Beresten* as applied to claim 31 (and presumably claim 1 for claims 27-29) in further view of U.S. Patent no. 6,177,797 to *Srinivasan*. Withdrawal of the rejections is respectfully requested for at least the following reasons.

A. Claims 1, 3, 7-11, 19-26 and 30

As was noted above, amended claim 1 recites a radio frequency coil that includes a first end ring and at least one of a second end ring or an end cap, and a plurality of elongated segments coupled to and positioned circumferentially around the generally annular opening of the first end ring and the at least one of the second end ring or the end cap to form a coil volume. The generally annular opening has a general

Serial No. 10/722,760

radius R about which the plurality of elongated segments are positioned, and includes an anterior extension extending radially beyond the general radius R to facilitate access into the coil volume.

As discussed above, *Beresten* discloses that the structures 50 and 51 are part of a plastic support structure 29 and, thus, are not part of the coil 35, as recited in claim 1 of the present application. Moreover, the alleged anterior extension blocks entry into the coil volume. *Beresten* has not been shown to disclose an RF coil having an annular opening with a general radius R about which the plurality of elongated segments are positioned, and an anterior extension extending radially beyond the general radius R to facilitate access into the coil volume, as recited in claim 1 of the present application.

Rohling discloses an RF coil that includes two end rings and a plurality of rungs connecting the two end rings. The plurality of rungs are recessed inward from the outer diameter of the end rings, and the rungs are equally spaced apart from one another.⁵ As indicated by the Examiner, *Rohling* does not disclose an anterior extension formed on the first and a second end ring or end cap.⁶ Thus, *Rohling* does not make up for the deficiencies of *Beresten*.

Accordingly, withdrawal of the rejection of claim 1 is respectfully requested.

Claims 3, 7-11 and 19-26 directly or indirectly depend from claim 1 and therefore can be distinguished from *Rohling* in view of *Beresten* for at least the same reasons.

Accordingly, withdrawal of the rejection of claims 3, 7-11 and 19-26 is respectfully requested.

B. Claims 27-29

Claims 27-29 directly or indirectly depend from claim 1. As was discussed above, *Beresten* has not been shown to disclose an RF coil having an annular opening with a general radius R about which the plurality of elongated segments are positioned,

⁵ See Fig. 4 of *Rohling*

⁶ See page 3, line 23 through page 4, line 1 of the Office Action

Serial No. 10/722,760

and *an anterior extension extending radially beyond the general radius R to facilitate access into the coil volume*, as recited in claim 1 of the present application.

Srinivasan relates to an RF coil that includes a first volume coil, a second volume coil and a third surface coil that at least partially overlaps the second volume coil. *Srinivasan*, however, has not been shown to disclose an RF coil having an annular opening with a general radius R about which the plurality of elongated segments are positioned, and *an anterior extension extending radially beyond the general radius R to facilitate access into the coil volume*, as recited in claim 1 of the present application. Thus, with respect to claim 1, *Srinivasan* does not make up for the deficiencies of *Beresten*.

Since claims 27-29 directly or indirectly depend from claim 1, they can be distinguished from *Beresten* in view of *Srinivasan* for at least the same reasons.

Accordingly, withdrawal of the rejection of claims 27-29 is respectfully requested.

C. Claims 32-33

Claims 32-33 directly or indirectly depend from claim 31. As was discussed above, *Beresten* does not disclose a head coil that includes a plurality of drive points, wherein the drive points are bridged using a push-pull configuration, as recited in claim 31 of the present application.

Srinivasan relates to an RF coil that includes a first volume coil, a second volume coil and a third surface coil that at least partially overlaps the second volume coil. *Srinivasan*, however, has not been found to disclose a head coil that includes a plurality of drive points, wherein the drive points are bridged using a push-pull configuration, as recited in claim 31 of the present application. Thus, with respect to claim 31, *Srinivasan* does not make up for the deficiencies of *Beresten*.

Since claims 32-33 directly or indirectly depend from claim 31, they can be distinguished from *Beresten* in view of *Srinivasan* for at least the same reasons.

Accordingly, withdrawal of the rejection of claims 32-33 is respectfully requested.

Serial No. 10/722,760

New Claims 34 and 35

New claim 34 depends from claim 1 and, therefore, can be distinguished from the cited art for at least the same reasons.

New claim 35 recites a radio frequency (RF) coil that includes a first end ring, at least one of a second end ring or an end cap, and a plurality of elongated segments coupled to and positioned circumferentially around a generally annular opening of the first end ring and the at least one of the second end ring or the end cap to form a coil volume. A first elongated segment and a second elongated segment of the plurality of elongated segments are spaced apart azimuthally at an angle greater than an azimuthal spacing of the remainder of the plurality of elongated segments to facilitate access into the coil volume.

With reference to Figs. 3 and 4 above, ten of the twelve legs 26 are spaced apart by about the same angular distance, e.g., about 30 degrees. The two legs about the anterior extension 22, however, are spaced apart a greater distance, e.g., about 45 degrees, to facilitate access into the coil volume.⁷

According to *Beresten*, the linear elements 40 are equally spaced in angle, with the top most two linear elements being spaced fifteen degrees to either side of the top center of the coil. Thus, all linear segments 40 are spaced apart equally (i.e. 30 degrees)⁸. *Beresten* does not teach or suggest a plurality of elongated segments coupled to and positioned circumferentially around the first end ring and the at least one of the second end ring or the end cap to form a coil volume, wherein a first elongated segment and a second elongated segment of the plurality of elongated segments are spaced about the anterior extension to facilitate access into the coil volume, as recited in claim 1 of the present application.

Rohling discloses that an RF coil that includes a pair of end rings joined by a plurality of rungs. The rungs are disposed equally spaced about the end rings.⁹

⁷ See Fig 4 and page 11, lines 3-10 of the present application

⁸ See column 5, lines 45-49 of *Beresten*

⁹ See column 1, lines 64-67 of *Rohling*

Serial No. 10/722,760

Neither *Rohling* nor *Srinivasan* have been shown to disclose a first elongated segment and a second elongated segment of a plurality of elongated segments spaced apart azimuthally at an angle greater than an azimuthal spacing of a remainder of the plurality of elongated segments to facilitate access into the coil volume, as recited in claim 35.

Accordingly, claims 34 and 35 is believed to be allowable.

III. CONCLUSION

Accordingly, all claims are believed to be allowable and the application is believed to be in condition for allowance. A prompt action to such end is earnestly solicited.

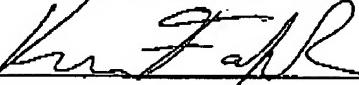
Serial No. 10/722,760

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

In the event any fee or additional fee is due in connection with the filing of this paper, the Commissioner is authorized to charge those fees to our Deposit Account No. 18-0988 (under the above Docket Number). In the event an extension of time is needed to make the filing of this paper timely and no separate petition is attached, please consider this a petition for the requisite extension and charge the fee to our Deposit Account No. 18-0988 (under the above Docket Number).

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By 

Kenneth W. Fafrak, Reg. No. 50,689

1621 Euclid Avenue
Nineteenth Floor
Cleveland, Ohio 44115
PH: (216) 621-1113
FAX: (216) 621-6165
B:\AIR\AIRIP106USA\IP106USA.R01a.wpd

Page 14 of 14